# Land, Waste and Materials Management

## Introduction

The use of materials, both raw and manufactured, leads to the generation of waste. Population size, economic activity, and the consumption of products are significant factors in the production of waste. California, as both the most populous and economically prosperous state in the nation, is faced with the challenge of managing its waste in an environmentally sound manner. Waste is a pressure on the environment — in terms of the loss of land and other resources necessary for its disposal or treatment, and of the environmental contamination that may potentially result from its treatment, storage, disposal and other handling. Radioactive wastes and infectious wastes are not addressed in this report.

The term "solid waste" means all putrescible and nonputrescible solid, semisolid and liquid waste, including garbage; trash; refuse; paper; rubbish; ashes; industrial wastes; demolition and construction wastes; abandoned vehicles and parts; discarded home and industrial appliances; dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste; and manure, vegetable or animal solid and semisolid wastes. "Hazardous waste" is waste that is ignitable, corrosive, reactive or toxic, or that is listed as such due to its known hazardous characteristic or because the process that generates it is known to produce hazardous waste. California's definition of a hazardous waste is more stringent than the federal government's. Hence, certain wastes that are not regulated as hazardous under federal law are subject to California hazardous waste requirements. These are commonly referred to as "California-only" hazardous wastes.

### Land, Waste and Materials Management Indicator

#### *Waste generation*

##### *Waste generation, in general*

**Statewide solid waste generation, disposal and diversion, per capita (Type I)**

**Number of tires diverted from landfills (Type I)**

**Hazardous waste shipments (Type I)**

**Federal and California-only hazardous waste generation (Type II)**

##### *Accidents/disasters/spills/releases*

**Hazardous material incidents (Type I)**

##### *Waste importation/exportation*

**Hazardous waste imported/exported (Type II)**

#### *Disposal to land*

**Statewide solid waste disposal per capita (Type I)**

**Hazardous waste disposal (Type I)**

#### *Site contamination*

**Cleanup of illegal solid waste disposal sites (Type II)**

**Tire cleanup (Type II)**

**Soil cleanup (Type I)**

**Contaminated sites (Type I)**

#### *Cross-media contamination*

**Number of environmental releases from active landfills (Type III)**

**Groundwater contaminant plumes - Extent (see Water section)**

**Contaminant release sites (see Water section)**

# WASTE

California began regulation of hazardous waste in the 1970s, and now operates a regulatory system more stringent than the federal system. The Department of Toxic Substances Control (DTSC) is responsible for administering the state's programs for regulating the management of hazardous waste, and for conducting and overseeing the cleanup of contaminated sites. In the past decade, increasing emphasis has been placed on pollution prevention efforts, particularly those aimed at hazardous waste reduction. In 1985, DTSC established a hazardous waste source reduction program, and in 1989, California became one of the first states to enact facility source reduction planning legislation. Subsequent legislation expanded the Department's pollution prevention programs.

The 1990 Integrated Waste Management Act created the California Integrated Waste Management Board (CIWMB), and set the stage for a series of statewide reforms in waste management. Among other things, this legislation established a 50 percent goal for solid waste diversion from landfills for local government, based on an integrated waste management hierarchy that emphasized waste reduction and recycling over all other options. In 2000, California diverted more than 42 percent of its solid waste. This is a tremendous accomplishment. The CIWMB strives to support programs and efforts to reduce the generation, and improve the management, of solid waste in California in order to conserve resources, develop sustainable recycling markets, to protect public health and safety, and the environment.

Conservation and waste diversion efforts are generally not captured well by environmental indicator systems. Environmental indicators focus on environmental discharges or emissions, ambient environmental conditions, and effects on humans and ecosystems. As such, their emphasis is on the "back end" of industrial society's impacts on the environment. While such information is critical in gauging ecosystem health and identifying broad environmental trends, it tends to de-emphasize the importance of conservation and pollution prevention efforts that are designed to lessen the impacts of human activity on the environment. Inherent in this problem is the fact that the environmental impacts of conservation-based programs are difficult to measure using environmental indicators; rather, these programs are factors that affect natural resources and ambient conditions in the long-term. At present, environmental indicators cannot clearly reflect the effectiveness of some of these programs on ecosystem and human health; however, failing to recognize such programs potentially discounts their tantamount impact on environmental outcomes.

To partially compensate for this, the links below highlight the programs and activities of the California Integrated Waste Management Board and the Department of Conservation (DOC) which lessen pressures on the environment through waste reduction, recycling, and diversion. Although these programs are not "indicators," they are paramount in importance and cannot be ignored when discussing California's environment. Please use the following links to view a listing of conservation and waste prevention programs the state is currently implementing: www.ciwmb.ca.gov and www.consrv.ca.gov/dor/index.htm

## Issue 1: Material Use

The use of materials requires the consumption of natural resources, and results in waste generation. The manufacture of products from virgin material is generally associated with greater environmental impact than reusing or recycling materials. Certain waste management strategies emphasize waste reduction, as well as the diversion of reusable or recyclable materials from the waste stream.

Characterizing material use in California will provide useful information for formulating waste management strategies. However, such characterization is extremely difficult at this time, given the broad range and massive amounts of products used in businesses, industries and homes.

## Issue 2: Waste Generation

Waste generation is the production of material generally intended for disposal. The composition and volume of wastes generated provide an indication of a potential for adverse impacts. Information about the nature of the wastes generated is important in the formulation of strategies to effectively manage it. For example, a recent study shows that paper and organic wastes (food, yard waste, textiles, carpet and rubber) make up about 65 percent of the overall composition of the solid waste stream disposed in California [CIWMB, *Statewide Waste Characterization Study: Results and Final Report*. December 1999. Available at: www.ciwmb.ca.gov/wastechar/study1999/default.htm].

Solid waste generation figures were first estimated in 1989 by each jurisdiction in California, as required by the Integrated Waste Management Act. (Depending on the context used, jurisdiction means a city or county.) Solid waste generation is estimated by adding the amount disposed plus the amount diverted from landfills, as calculated based on guidance issued by CIWMB; the amount diverted reflects source reduction, recycling and composting programs.

Hazardous wastes are regulated under federal law (the Resource Conservation and Recovery Act, or RCRA), as well as under California law (Health and Safety Code, Chapter 6.5), and are tracked by hazardous waste manifests.

The volume of waste requiring management in the state consists of: (a) wastes generated during the course of normal residential, commercial or industrial activity; (b) wastes produced as a result of accidents, spills and releases; (c) wastes generated from cleanup of contaminated sites, and, (d) wastes imported into California.

### Indicators

**Statewide solid waste generation per capita** (Type I)

**Statewide solid waste diversion per capita** (Type I)

**Hazardous waste shipments** (Type I)

**Federal and California-only hazardous waste generation**

## Sub-issue 2.1: Waste generation, in general

Waste is generated on an ongoing basis. Information about the composition and volume of waste generated can help inform waste management strategies.

### Indicator

**Hazardous material incidents** (Type I)

## Sub-issue 2.2: Accidents/disasters/spills/releases

Clean-up operations following accidents, disasters (such as earthquakes, floods and fires), spills and other releases generate wastes. Where hazardous chemicals are involved, the resulting waste may be classified as hazardous. In addition, the transportation, storage, treatment and disposal of waste may release environmental contaminants.

### Indicator

**Hazardous waste imported/ exported** (Type II)

## Sub-Issue 2.3: Waste importation/exportation

The movement of waste to and from California is linked to waste generation and the availability of disposal (or treatment) options at the jurisdiction where the waste was first generated. Waste importation and exportation can also reflect a demand in the receiving jurisdiction for recycling stock or for secondary raw material.

### Indicators

**Statewide solid waste disposal per capita** (Type I)

**Number of tires diverted from landfills** (Type I)

**Hazardous waste disposal** (Type I)

## Issue 3: Disposal to Land

Disposal is the final placement or destruction of waste. Disposal may be accomplished through placement into a landfill that complies with federal and state requirements, surface impoundments, deep-well injection, or other regulated disposal methods.

## Issue 4: Site Contamination

Illegal or unsound waste management practices at regulated facilities or unregulated sites can contaminate land, requiring clean-up actions to mitigate threats to human or ecological health. Solid waste sites or dumps, where a responsible party either cannot be identified or is unable or unwilling to pay for timely remediation, are cleaned up under the Solid Waste Disposal Cleanup Program [AB 2136 (Eastin), Chapter 665, Statutes of 1993]. Waste tire sites are of particular concern. When improperly managed, these stockpiles present a significant risk to the environment and public health, due to the potential for fires and the potential to become a breeding ground for insects, especially mosquitoes.

Sites with hazardous material contamination pose a concern due to the potential for human exposure. Contaminated sites include military facilities, "Brownfield" sites (properties that are contaminated or thought to be contaminated which are underutilized due to perceived remediation costs and liability concerns) and legacy sites (sites with historical contamination or naturally occurring hazardous materials, such as asbestos).

Clandestine drug laboratories represent a unique subset of contaminated sites. The predominant illicitly manufactured drug in California is methamphetamine, although other drugs have been manufactured, including PCP (angel dust, phencyclidine), ecstasy, and psilocybin. These labs use a variety of hazardous substances, including acids, bases, and solvents, to synthesize illegal drugs. In addition, many of the products and by-products are toxic and may be extremely toxic. The clandestine labs are sometimes located in residences, thus posing direct risks to occupants and nearby residences. Land, surface water and groundwater contamination may occur as a consequence of the illegal dumping of lab waste. Following the discovery of a clandestine lab by law enforcement agencies, removal of hazardous substances is conducted by DTSC contractors.

### Indicators

**Clean up of illegal solid waste disposal sites** (Type II)

**Tire cleanup** (Type II)

**Soil cleanup** (Type I)

**Contaminated sites** (Type I)

### Indicators

**Number of environmental releases from active landfills**
(Type III)

**Groundwater contaminant plumes – Extent**
(see Water section)

**Contaminant release sites**
(see Water section)

## Issue 5: Cross-Media Contamination

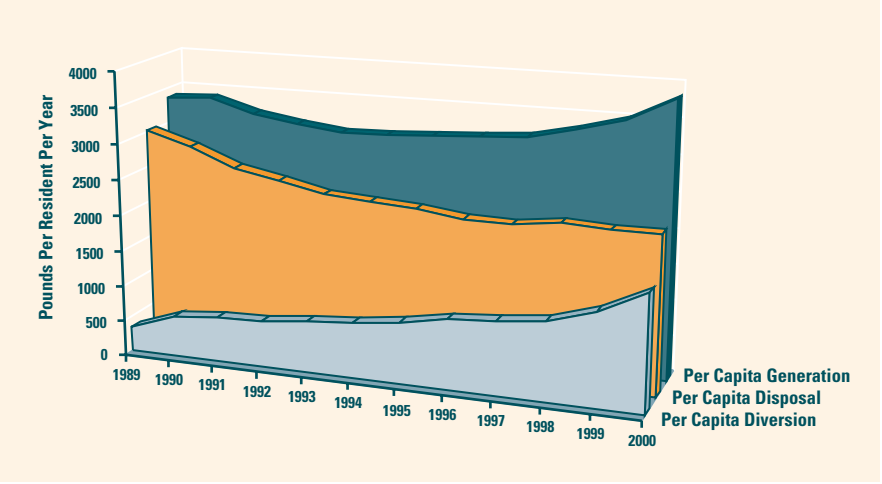
Land disposal of wastes may lead to the movement of contaminants to water or to air, requiring clean-up actions to mitigate potential threats to human or ecological health. Landfill trash generates gases and leachate, sometimes for as long as 200 years. To mitigate cross-media contamination from solid waste landfills, closure and maintenance plans to protect the environment and the public are developed and implemented. Illegal and abandoned dumpsites pose added risks from exposed waste leachate, landfill gas, vectors, and hazardous materials.

## Statewide Solid Waste Generation, Disposal and Diversion, Per Capita

*Statewide efforts to reduce, re-use, recycle and compost have kept millions of tons of waste out of landfills.*

**Type I**

**Level 3**
**Goal 6**




### What are the indicators showing?

*This graph shows the estimated annual amount of waste generated, disposed, and diverted by each California resident for each year from 1989 through 2000. Per capita disposal of solid waste has decreased, even as generation has increased. This is due to a sharp increase in diversion. Diversion involves recycling, composting and reduction in waste generation.*

### Why is the indicator important?

Major trends in the production and final disposition of solid waste in California are reflected by this indicator. Thus, it is a valid measure of California's economic sustainability, particularly with respect to resource consumption.

This indicator also measures response to the state's adoption of the Integrated Waste Management Act of 1989 (IWMA). Under the oversight of the California Integrated Waste Management Board (CIWMB), California's cities, counties and businesses have implemented thousands of waste prevention, recycling and composting programs (collectively known as diversion programs).

The waste management hierarchy adopted by the state in the IWMA aims to minimize the rate of solid waste disposal by decreasing the rate of waste generation and by increasing the rate at which waste is diverted from disposal. The IWMA requires all jurisdictions to divert half of their waste in the year 2000; recent legislation extended the 50 percent goal indefinitely. Newspapers and the broadcast media use diversion rates — calculated by removing disposal from estimated generation and expressing the remainder as a percent of total generation — to judge the progress of a particular city or county in reducing waste and complying with the IWMA. The statewide diversion rate has increased from 10 percent in 1989 to 42 percent in 2000.

Disposal measures the solid waste deposited into California's landfills or waste-to-energy facilities, or exported out of the state. Generation measures total waste produced in the state; it is the sum of waste disposed and waste diverted. Diversion measures waste prevented, waste re-used, waste recycled or waste composted.

## What factors influence this indicator?

Population growth and economic activity cause waste generation to rise. However, this interdependence can be altered by changes in the character of manufacturing activities, or by waste prevention programs that improve manufacturing processes or packaging methods, and thus slow the growth of waste generation. Public education also impacts this relationship; a decade of efforts by the CIWMB and California's cities and counties to educate the public about waste and recycling issues have raised awareness and changed attitudes about the impacts of consumptive behaviors.

Recycling efforts undertaken by local governments, businesses, citizens and the state determine how much waste will be diverted. Availability of funding influences the extent of these efforts; however, the oversight of the CIWMB, and its ability to levy fines against cities and counties that do not implement waste diversion programs, factor into the number and scope of operating diversion programs. Additionally, the ever-changing composition of the waste stream influences the types of recycling programs that may be effective. Information about programs and activities implemented by the cities, counties and CIWMB can be found at www.ciwmb.ca.gov

The Department of Conservation administers the California Beverage Container Recycling and Litter Reduction Act, enacted in 1986. The goal of the Act is to achieve an 80 percent recycling rate for aluminum, glass, plastic, and bimetal beverage containers sold in California, thereby reducing the beverage container component of litter in the state. Information about this program can be found at: www.consrv.ca.gov/dor/index.htm

Per capita solid waste disposal rates declined dramatically during the early 1990s, as newly implemented diversion programs removed the easiest and most valuable materials from the waste stream. During the boom years of the late 1990s, per capita statewide waste generation climbed. Per capita disposal remained flat during this time of rapid economic growth, most likely due to the efforts of California jurisdictions to implement diversion programs which remove materials from the waste stream.

Continued monitoring of solid waste generation, disposal and diversion will show whether California's cities, counties and state agencies, under guidance from the CIWMB, can meet the challenge of removing the more difficult, and less valuable, resources from the waste stream and channel those to their most appropriate uses.

## Technical Considerations:

### *Data Characteristics*

The Integrated Waste Management Act's aim is to conserve resources and extend landfill capacity, not to penalize jurisdictions for increases in population or economic growth. Thus, while having more residents or more economic

activity results in increased waste generation, these factors will not automatically cause affected jurisdictions to fail to meet statutory diversion goals. By adjusting waste generation figures for changes in population and economics, the CIWMB-approved "adjustment method" allows year-to-year comparison of a jurisdiction's efforts to reduce disposal, regardless of the changes in population and economics.

Annual waste generation was estimated by all California jurisdictions as part of their original compliance with the IWMA. Since then, waste generation rates for each jurisdiction have been estimated by projecting the original data forward using the aforementioned "adjustment method." CIWMB staff perform a similar calculation to determine statewide estimates.

The CIWMB's Disposal Reporting System (DRS) tracks waste disposal by each city, county and regional agency in California. Tracking originates with each solid waste facility operator, who conducts quarterly "waste origin surveys" to estimate the amount of waste, in tons, disposed at that facility by each jurisdiction. Facility operators report that information to each county, which then submits quarterly disposal reports to the CIWMB. CIWMB staff aggregate that data to produce a statewide total.

The CIWMB calculates the annual 'diversion rate' for each California jurisdiction by subtracting their DRS disposal amount from the waste generation estimated through the use of the adjustment method, and expressing the diversion rate as a percent.

### *Strengths and Limitations of the Data*

Over the years, the CIWMB and its various stakeholders have occasionally disagreed about what constitutes diversion. When diversion studies were performed in the early 1990s, many diversion activities were inadvertently omitted for a number of reasons: because the science and techniques were new; because businesses were reluctant to release what they felt was sensitive waste generation information; because best practices were not known; and because the CIWMB had not yet standardized the measurement process. These early measurements directly impact today's waste generation estimates. Now that measurement techniques have matured, best practices are known, and the CIWMB has improved diversion measurement, accuracy of generation estimates should gradually increase.

Current-year generation estimates for individual jurisdictions may also be impacted by the use of the CIWMB's "adjustment method." Although the CIWMB believes the adjustment method works well for the great majority of jurisdictions, all economic data is not perfectly suited for every jurisdiction. These limitations do not impact statewide data.

Most of the limitations of the diversion measurement system, in particular DRS, concern individual jurisdictions. A good example is the allocation of

waste by a landfill to the various cities it serves. Although this localized "allocation" error may tremendously impact a particular jurisdiction, the total waste accepted by the landfill is correct; the latter information is what goes into the statewide disposal figure. Also, because landfill tipping fee taxes are collected by the California Board of Equalization, the CIWMB has a reliable means to check DRS figures.

Ways to improve the limitations of the DRS, the CIWMB-approved adjustment method, and the entire diversion measurement system were considered by a stakeholder working group. The CIWMB will vote on the working group recommendations and forward the report to the Legislature in early 2002.

**References:**

California Integrated Waste Management Board. *Diversion Study Guide.* Posted at: www.ciwmb.ca.gov/lglibrary/dsg/default.htm

Population totals: Department of Finance, Demographic Research Unit. Posted at: www.dof.ca.gov/HTML/DEMOGRAP/druhpar.htm

Generation totals: California Integrated Waste Management Board. Posted at: www.ciwmb.ca.gov/LGCentral/Rates/Diversion/RateTabl.htm

Disposal and Diversion Statistics: California Integrated Waste Management Board. Posted at: www.ciwmb.ca.gov/LGCentral/Rates/default.htm

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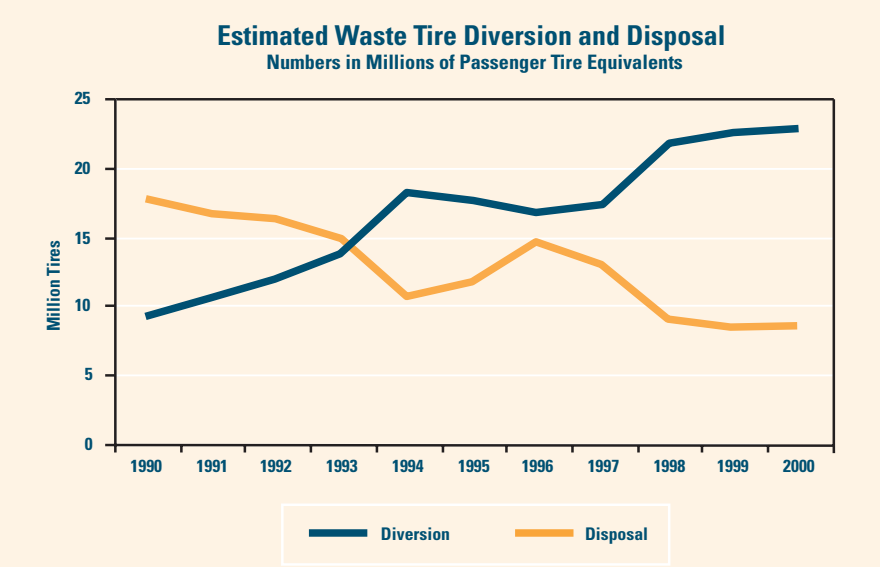
## Number of Tires Diverted from Landfills

*Significant effors have been made to re-use tires and reduce disposal at landfills.*

**Type I**

**Level 3**
**Goal 6**




### What is the indicator showing?

*Over the past 11 years, the quantity of tires that have been recycled or reused in some manner has increased while those disposed of at landfills has decreased.*

### Why is this indicator important?

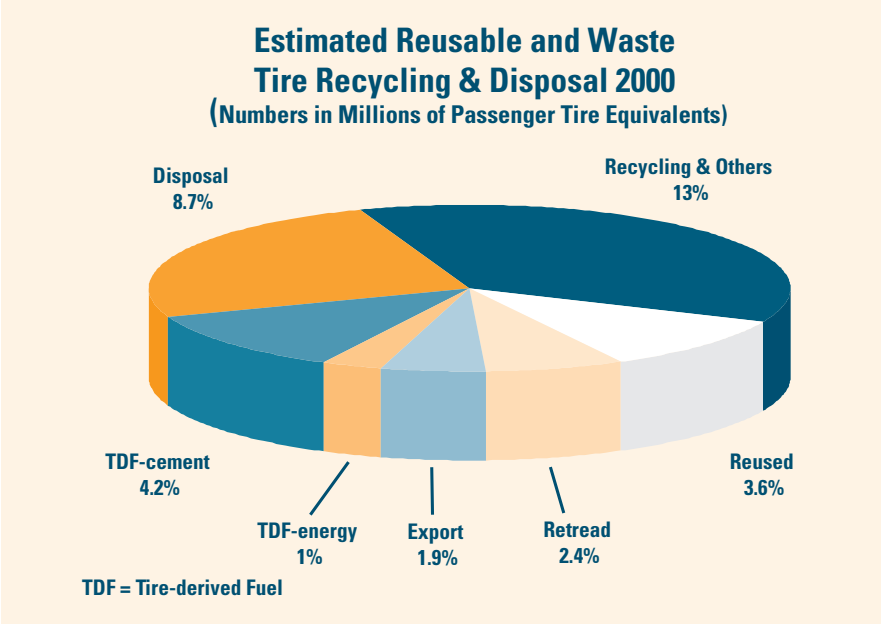
For the year 2000, California was challenged with the responsibly of managing 31.6 million reusable and waste tires entering the waste stream. The California Integrated Waste Management Board (CIWMB) estimates that nearly 23 million tires (72 .5 percent) are diverted annually for various alternative uses, including reuse, re-treading, recycling, and combustion. The remaining 8.7 million tires are shredded and disposed of in California's permitted solid waste landfills, stored at permitted sites, or illegally disposed of around the state. In addition, an estimated two million waste tires are stockpiled throughout the state, posing a health and safety risk to the public.

Waste tires are very difficult to deal with. If stored in large quantities, tires can spontaneously combust, emitting highly toxic smoke and particulate matter. Dioxins and polycyclic aromatic hydrocarbons, two highly toxic classes of chemicals, are by-products of tire combustion. As seen in major fires at Westley (1999), Tracy (1998) and Panoche (1996), tire fires can contaminate surface water, groundwater, air, and soil. Tire fires require up to 100 gallons of water per tire to suppress, creating additional environmental problems. Often the best course of action for firefighters, as in Tracy, is to let the fire burn itself out, which can take months.

Since water collects in tires, they can also serve as breeding grounds for mosquitoes that, in addition to being a nuisance, can carry serious diseases such as encephalitis. Encephalitis can be a very serious, even fatal, disease in children. Livestock is also seriously affected by a number of strains of encephalitis. For these reasons, proper disposal of tires is of great significance.

## What factors influence this indicator?

The main factor influencing the ability to divert tires from landfills or illegal dumping is the development of viable markets for waste tires. Tires can be burned as fuel supplement at cement kilns. They can be incorporated into asphalt used in road construction. Tires can be decomposed into three recoverable fractions — carbon black (with steel, fiber and ash), oil and gas – through a process known as pyrolysis; also known as gasification, liquefaction, or destructive distillation, pyrolysis is defined as thermal degradation in the absence of oxygen. The development of alternative uses for tires is linked to economic development and profitability, which at present is still weak. The chart below illustrates the fate of waste tires based on estimates for the year 2000. As a note, "Passenger Tire Equivalents" is a measure based on a 20-pound average weight of a passenger car waste tire. This conversion factor allows for a common unit of measure since waste tires come in many different sizes.




The use of waste tires for energy and as a fuel supplement in cement kilns, and the import and export of waste tires are significant factors reflected in the diversion and disposal trends shown on the graph for this indicator. Diversion of waste tires from landfill disposal has largely increased since 1990, with a sudden increase in 1994. This increase coincided with increases in the number of waste tires combusted for energy and as a fuel supplement in cement kilns. Until 1994, a major combustion facility largely burned newly generated waste tires (i.e., tires generated during the same year). As a result of legal action, however, the facility was directed to burn decades-old tires from a tire pile. Waste tire disposal has generally decreased during the past decade, except for a peak in 1996, when the number of imported waste tires more than doubled, as their use in energy production and cement kilns declined.

In FY 1999/2000, the Board awarded $2.4 million in grants and contracts to 78 businesses and government entities through its waste tire diversion

program. Of the total funding, 15 percent ($374,043) was directed to public education outreach and amnesty day programs implemented at the local level to prevent illegal disposal. Schools and local governments received 42 percent ($1,012,918) for the installation of rubber playground mats and track surfacing projects promoting the use of tire-derived crumb rubber. Twelve percent ($299,990) was used to promote the commercialization of emerging technologies for recycling tires. Thirty-one percent of the funds ($755,000) supported rubberized asphalt concrete (RAC) projects. One grant ($7,500) supported the purchase of tire-derived green building products.

| Amount | % of total | Type of project |
|---|---|---|
| $374,043 | 15.3% | Public education outreach, "amnesty day" programs (local jurisdictions) |
| $1,012,918 | 41.4% | Rubber playground mats and surfacing projects promoting the use of tire-derived crumb rubber (in schools, local government) |
| $299,990 | 12.2% | Commercialization of emerging recycling technologies |
| $755,000 | 30.8% | Rubberized asphalt concrete projects |
| $7,500 | 0.3% | Tire-derived green building products |

In addition to the development of new markets for waste tires, legal restrictions have impacted tire disposal. In 1990, the California Legislature enacted comprehensive requirements for the storage and disposal of waste tires. Assembly Bill (AB) 1843 created an environmental regulatory program to control the storage and disposal of waste tires. AB 1843 requires persons who store or stockpile more than 500 waste tires at a specific location to acquire a major or minor waste tire facility (WTF) permit and comply with technical standards for the safe storage of waste tires. By definition, a major WTF stores, stockpiles, accumulates, or discards 5,000 or more waste tires; a minor WTF stores between 500 and 5,000 waste tires. In 2000, Senate Bill 876 was signed into law, increasing the fee on the sale of new tires and extending the CIWMB's regulatory authority.

## Technical Considerations:

### *Data Characteristics*

Currently, there is no mandated reporting requirement to report waste tire uses to the state. The generation estimates discussed are based on population; the number of vehicles registered in the state; vehicle miles traveled; and average fuel consumption. Reuse/recycling numbers are based on information from businesses involved with waste tire collection and processing.

### *Strengths and Limitations of the Data*

The indicator is based on estimated, rather than collected data. However, a revised manifest system is being developed; which should solve the problem of determining the number of waste tires generated in the state, as well as the number of tires reused and recycled.

**References:**

Tire Management Data: California Integrated Waste Management Board. Posted at. www.ciwmb.ca.gov/Tires/default.htm

California Integrated Waste Management Board. *Waste Tire Management Program: 2000 Annual Report*. July 2001. Posted at: www.ciwmb.ca.gov/Publications/default.asp?pubid=910

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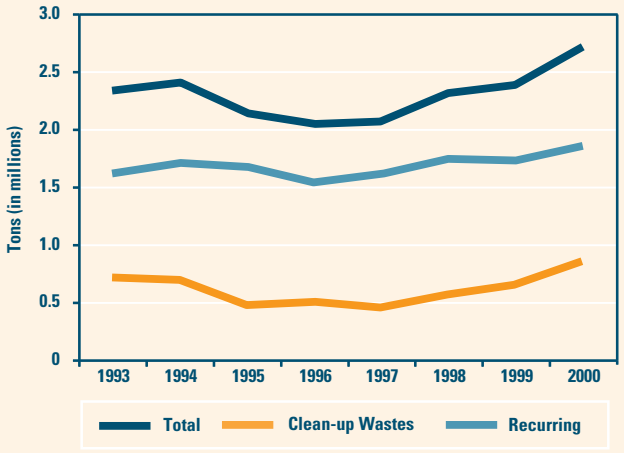
Type I

Level 3
Goal 6

# Hazardous Waste Shipment

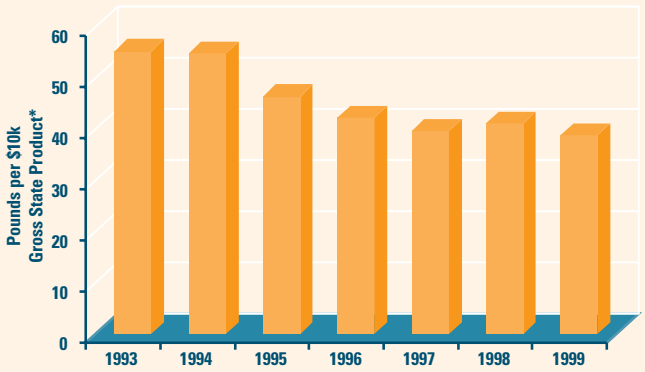
*More hazardous waste is being shipped, but less per unit of economic activity.*

### Hazardous Waste Shipments




Note: Cleanup wastes include PCB-contaminated wastes, asbestos, and soil from site cleanups.

### Hazardous Waste and the Economy




*GSP in current dollars

## What is this indicator showing?

*The amount of hazardous waste shipped has been increasing since 1996. The total amount consists of clean-up wastes and recurring wastes. The amount of these cleanup wastes has increased by almost 20 percent since 1996, while recurring wastes increased by only 15 percent during the same time period. Over the past seven years, the amount of hazardous waste generated per unit of economic activity has decreased; 30 percent less waste was generated per $10,000 of gross state product in 1999 than in 1993.*

## Why is this indicator important?

This indicator reflects the annual amount of hazardous waste generated in California, and subsequently shipped for treatment, storage and disposal; it does not include hazardous waste which has been treated or disposed onsite (at the facility where it was generated). Total hazardous waste tonnage is separated into "cleanup wastes" and "recurring wastes." "Clean-up wastes" include those containing polychlorinated biphenyls (PCBs) or asbestos, and those generated following site cleanups; the removal of these wastes from the environment for treatment or disposal in a secure landfill reduces the potential for exposures to their hazardous constituents. "Recurring hazardous wastes" are generated in the course of commercial or industrial operations.

Unless managed in an environmentally sound manner, hazardous wastes can cause adverse impacts on human and ecological health. The transportation, storage, treatment and disposal of hazardous waste create a potential for the release of hazardous chemicals into the environment. Pollution prevention activities can reduce the quantity and composition of hazardous waste generated.

## What factors influence this indicator?

The total amount shipped annually is presented as the overall statewide trend. Since 1993, the amount of waste shipped has increased by approximately 16 percent. Because hazardous waste generation is related to economic

activity, the amount generated per $10,000 of Gross State Product (GSP) is also presented. A different trend is revealed — one which shows a consistent decline. This means that the state's economy is producing less hazardous waste per unit of economic activity.

Certain sectors of the economy, most notably the manufacturing sector, are likely to produce more hazardous waste than others. California's economy has shifted over the past two decades to one which is increasingly becoming services-oriented (the services sector of the economy includes business services, health services, hotels and lodging, repair services, and others).

Cleanup activities, which include asbestos removal from homes and businesses and removal of contaminated soil, will affect the amount of hazardous waste shipments, as will changes in California's classification of wastes as hazardous. As more wastes (e.g., cathode ray tubes and other electronic wastes) are properly managed as hazardous waste, the amount of hazardous waste shipments will also increase.

In the past decade, environmental programs have emphasized the need for pollution prevention efforts instead of the more traditional "end-of-pipe" remedies. In California, the Department of Toxic Substances Control (DTSC) has been responsible for the implementation of legislation to promote source reduction. The trends in hazardous waste generation will obviously be impacted by the number of businesses that carry out source reduction plans and strategies. The amount of hazardous waste per small generator has been decreasing since 1993 (DTSC, 2000).

Other factors that influence hazardous waste generation trends include: the availability and accessibility of cleaner technologies; the intensity of local programs which could bring more businesses into the hazardous waste regulatory framework; the availability of options (or lack of capacity) for hazardous waste treatment and disposal; the costs of treatment and disposal; and improved compliance with, or enforcement of, hazardous waste requirements.

## Technical Considerations:

### *Data Characteristics*

Data for the indicator are based on amounts reported on hazardous waste manifests. The generator of the waste is required by law to prepare a manifest for every offsite shipment of hazardous waste. Manifests include information on the generator, transporter and treatment, storage or disposal facility receiving the waste, and the type and quantity of the waste shipment. The manifests are designed to track each shipment from "cradle to grave," that is, from the site of its generation to the facility designated by the generator. Once the shipment reaches its destination, the manifest is returned to the DTSC, where data from the form are entered into an automated data system known as Haznet.

The data include waste from site cleanups, which reduce human and ecological risk, and from household hazardous waste collection centers.

The Gross State Product data are maintained by the U.S. Department of Commerce, Bureau of Economic Analysis.

## Strengths and Limitations of the Data

These data include wastes regulated as hazardous under the federal law known as the Resource Conservation and Recovery Act, or RCRA, as well as hazardous waste as defined by the State of California in Title 22, California Code of Regulations (also known as "non-RCRA waste" or "California only hazardous waste"). Because non-RCRA wastes are included, the indicator is not comparable with other states or nationally.

As noted earlier, data on hazardous waste treated onsite are not included. On the other hand, there is a potential for accounting for certain shipments, such as those to transfer stations, more than once. An additional limitation is associated with converting the units reported on the hazardous waste manifest to a consistent measure of weight; conversion factors may not adequately account for the variance in density of the range of wastes shipped. Finally, generators of the hazardous waste must enter on the manifest the appropriate California Waste Codes for the waste material being shipped. Because of the nature of this coding system, differentiating the type of material, or distinguishing between one-time and recurring wastes cannot be easily done.

Because manifests are required for all offsite shipments of hazardous waste, the data are considered quite complete.

**References:**

Hazardous waste tonnage: Department of Toxic Substances Control, Haznet data system.

Gross State Product: U.S. Department of Commerce, Bureau of Economic Analysis: Posted at: www.bea.doc.gov/bea/regional/gsp/

Department of Toxic Substances Control. *Pollution Prevention Report and 2-Year Workplan.* Office of Pollution Prevention and Technology Development, September, 2000. Posted at: www.dtsc.ca.gov/PollutionPrevention/pp-report-and-2year-workplan.pdf

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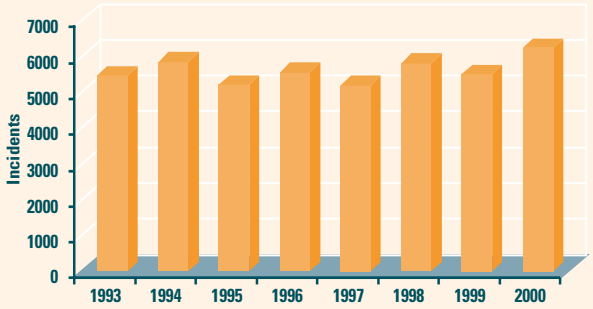
## Hazardous Material Incidents

*The number of hazardous material incidents has been relatively consistent.*

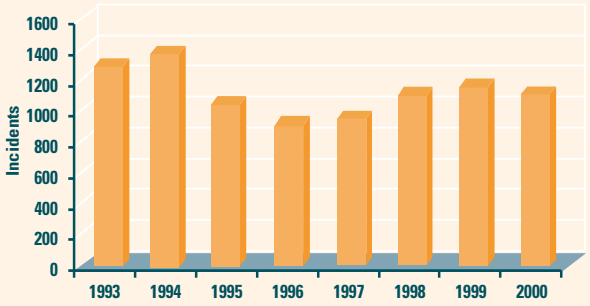
**Type I**

**Level 3**
**Goal 6**

**California Hazardous Material Incidents Reported to the Office of Emergency Services**




**California Hazardous Material Transportation Incidents Reported to the U.S. Department of Transportation**




### Why is this indicator important?

Releases, spills, or other incidents involving hazardous materials pose an immediate and direct threat to humans and the environment. The first indicator shows the number of incidents involving hazardous materials that have been reported annually to the Governor's Office of Emergency Services (OES). The U.S. Department of Transportation (DOT) collects standardized, detailed reports of hazardous material transportation incidents nationwide; the second indicator tracks the incidents that were reported in California. Transportation-related hazardous material incidents represent a subset of all hazardous material incidents. Hazardous waste shipments, a separate indicator, are a small subset of hazardous materials shipments in California.

Hazardous material incidents represent potential pressures on human health and the environment exerted by accidental releases of hazardous materials. In many cases, cleanup operations following these incidents generate waste that may be classified as hazardous wastes. Tracking these incidents over time can help guide the formulation of policies or strategies to prevent the occurrence of future incidents, or to improve responses to minimize the adverse impacts of these incidents.

### What factors influence this indicator?

Most hazardous material incidents represent accidental releases — that is, the release is a consequence of an unplanned and unintended event or series of events. The occurrence of accidents can generally be minimized by good operating practices, including the use of appropriate, well-maintained equipment, operated by properly trained employees. In many cases, regulatory

### What is the indicator showing?

*Over the past seven years, the number of incidents involving hazardous materials reported to the Office of Emergency Services has remained relatively constant; the highest number was reported in 2000. During the same time period, incidents involving the transportation of hazardous materials have fluctuated between 800 and 1,400 per year.*

requirements or industry standards have been promulgated to ensure the safety of processes and equipment. Hence, various operational and equipment factors can influence the frequency of hazardous material incidents.

The likelihood of the occurrence of a release also increases with the amount of the material being handled or transported. Economic factors can directly influence manufacturing and shipping activities. One would expect the increased amount of materials used and transported to result in increased spill and transportation incidents. Improved storage, treatment, and transportation technologies and enforcement capabilities may contribute to a decrease in the number of incidents.

It is difficult, however, to draw conclusions regarding the specific factors that influence the trends shown by the indicators. Overall, the number of hazardous material incidents remained relatively constant, with the highest number of incidents being reported in 2000. Incidents involving the transportation of hazardous materials have fluctuated over the past seven years. The fluctuations, however, have occurred over a relatively narrow range (from approximately 900 incidents in 1996 to approximately 1,400 in 1994).

## Technical Considerations:

### *Data Characteristics*

The data for hazardous material incidents are from the Governor's OES. State law requires all significant releases or threatened releases of hazardous material, including oil, be immediately reported by telephone to the OES' Warning Center. These reports are received from handlers, employees, authorized representatives, agents or designees of handlers. State notification requirements for a spill or threatened release include the caller identity; location, date and time of spill, release or threatened release; chemical name and, quantity involved; and description of the event.

The data for transportation-related incidents are part of the Hazardous Materials Information System (HMIS), which is maintained by the DOT, Office of Hazardous Materials Safety. The data are provided by hazardous materials shippers or transporters, who complete a Hazardous Materials Incident Report, and submit it to the DOT Office of Hazardous Materials Transportation.

### *Strengths and Limitations of the Data*

Calls made to the OES Warning Center are not verified, and may include reports that did not actually involve hazardous materials. All calls are counted as incidents, regardless of the extent of threat to public health and the environment. Because the data depend on reports from handlers and other involved parties, the threat of liability may hinder reporting.

Incidents that are subject to the reporting requirement to U.S. DOT are those involving hazardous materials, as defined in Title 49 of the Code of Federal Regulations. Materials which do not meet the DOT definition may still pose a risk to public health or the environment and not be captured by these data. For example, the 1991 metam sodium spill into the Sacramento River following a train derailment would not have been captured as a hazardous material incident; at the time of the spill, metam sodium was not regulated by DOT as a hazardous material.

Finally, the indicator presents a crude measure of an environmental pressure. The impacts of the incidents on humans and the environment cannot be determined from an aggregate count of a wide range of incidents.

**References:**

Governor's Office of Emergency Services, Hazardous Materials Spill Database.

U.S. Department of Transportation, *Biennial Reports on Hazardous Materials Transportation.* Office of Hazardous Materials Safety, Research and Special Programs Administration. Posted at hazmat.dot.gov/ohmforms.htm#biennial

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**Type I**

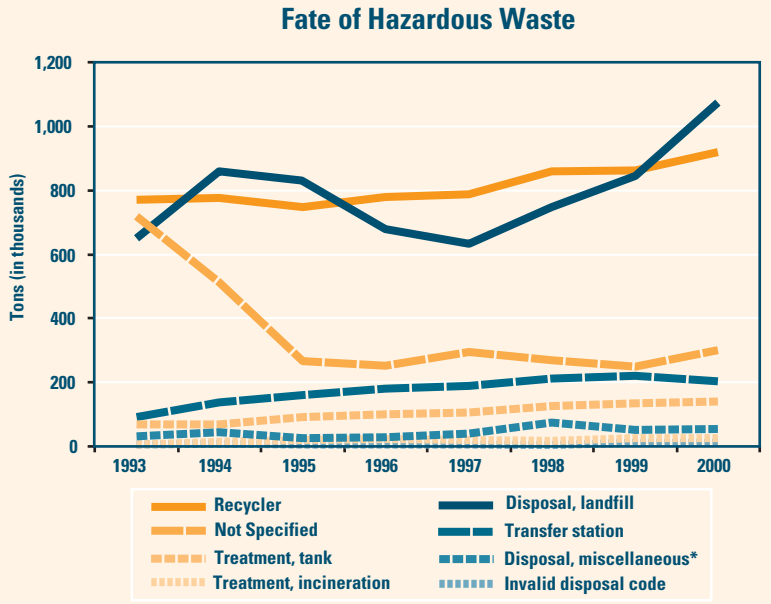
**Level 3**
**Goal 6**

## Hazardous Waste Disposal

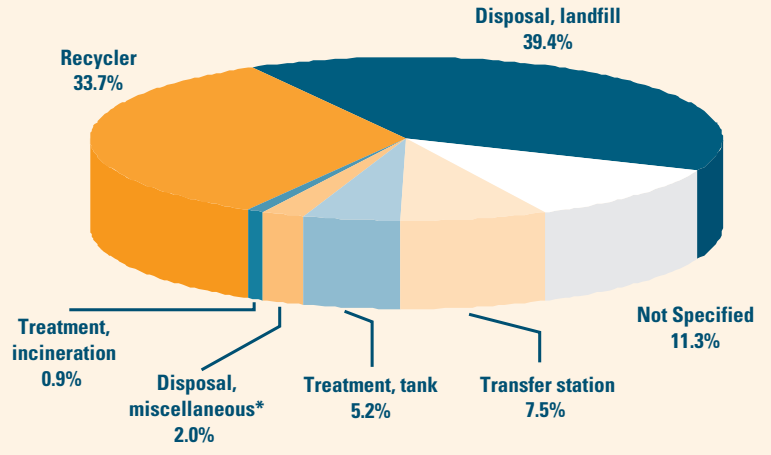
*Most hazardous waste shipped offsite is landfilled or recycled.*

### What is the indicator showing?

*Almost three-quarters of the hazardous waste shipped offsite in 2000 was destined for disposal in landfills or recycling. In recent years, more hazardous waste is being sent to recyclers (about a 19 percent increase since 1993), but even more waste is going to permitted landfills (a 65 percent increase during the same time period).*




*Disposal, miscellaneous includes surface impoundment, land application, injection well, other




*Disposal, miscellaneous includes surface impoundment, land application, injection well, other

### Why is this indicator important?

The indicator shows trends in how hazardous wastes are managed, based on information from manifests prepared for each shipment of hazardous wastes. The various methods used to treat and dispose of hazardous wastes each have

a potential associated risk. The ultimate fate of hazardous waste reflects potential pressures on human health and the environment.

Disposal in landfills has fluctuated over the past seven years, but has been on the increase in recent years. In 2000, more of the hazardous wastes ended up in landfills than in other destinations. Over 25 percent more tons were disposed in landfills that year than in the previous year; over the past seven years, there has been a 65 percent increase in the amount disposed in landfills. Although today's permitted landfills are designed to prevent the movement of hazardous constituents into water, air, or other media, the possibility of environmental contamination still exists. Further, landfill disposal uses up valuable land resources.

Recycling is the second most prevalent method for managing hazardous wastes in 2000. The trend in recycling hazardous waste is relatively stable, but is on a slight increase (a 20 percent increase since 1993, and about an 8 percent increase over the previous year). By recovering and reprocessing usable chemicals from wastes, recycling reduces the volume of waste destined for disposal, and reduces the need to extract and/or process virgin material.

Over six percent of the hazardous waste in 2000 was destined for treatment facilities. Treatment involves changing the physical, chemical, or biological character or composition of a hazardous waste, or removing or reducing its harmful properties or characteristics. Treatment methods include incineration (which can create hazardous byproducts), tank treatment, and surface impoundment. Other disposal methods include land application, surface impoundments, injections wells and others. Amounts that are destined for transfer stations are also tracked. However, because wastes are generally shipped to transfer stations for temporary storage or consolidation, these facilities are only an interim recipient of hazardous wastes.

The "Not Specified" category – which makes up over ten percent of the wastes in 2000 — includes California-only hazardous waste shipped out of state, as well as manifests with no disposal code identified. The tonnages for this category have declined significantly (by almost sixty percent) since 1993.

## What factors influence this indicator?

Disposal and treatment options selected by hazardous waste generators can be influenced by existing regulations and policies governing hazardous waste management, by the availability and accessibility of disposal and treatment facilities, and by the costs associated with the various options. For example, policies that provide incentives for, or otherwise encourage, alternatives to disposal would tend to decrease the proportion of wastes being disposed of in landfills. Restrictions on the types of wastes that can be disposed of in landfills, imposed either by regulation or by the landfill operator, will also tend to impact the trends.

The characteristics of the waste is another factor. Some types of hazardous wastes, such as waste solvents, or wastes containing recoverable metals, will likely be shipped for recycling rather than for disposal. Some hazardous wastes, such as polychlorinated biphenyls (PCBs), can only be incinerated.

Site cleanups can generate large amounts of contaminated soil. These are typically disposed of in landfills, or shipped out of state. Hence, increased cleanup activities or the cleanups which involve the removal of large volumes of contaminated soil can increase the proportion of wastes destined for landfills or in the "Not Specified" category.

## Technical Considerations:

### *Data Characteristics*

Data for this indicator are based on information reported on hazardous waste manifests. The generator of the waste is required by law to prepare a manifest for every offsite shipment of hazardous waste. Manifests include information on the generator, transporter and treatment, storage or disposal facility receiving the waste; and the type and quantity of the waste shipment. The manifest is designed to track each shipment from "cradle-to-grave," that is, from the site of its generation to the facility designated by the generator. Once the shipment reaches its destination, the manifest is returned to the Department of Toxic Substances Control, where data from the form is entered into an automated data system known as Haznet.

### *Strengths and Limitations of the Data*

The indicator presents data on the management of hazardous waste defined by the State of California (Title 22, California Code of Regulations), also known as non-Resource Conservation and Recovery Act (RCRA) hazardous waste, and by the federal government under RCRA (Title 40, Code of Federal Regulations). Manifests are required for all hazardous waste generation, so the data are considered quite complete. Because this includes non-RCRA as well as RCRA waste, the numbers are not comparable with other states, which only track RCRA waste.

The generator of the hazardous waste is responsible for entering appropriate information on the facility designated to receive the shipment. In some cases, this information is not provided. The "Not Specified" category includes data from manifests which had a blank destination, and includes non-RCRA hazardous waste shipped out of state, where it is not tracked as a hazardous waste.

**Reference:**

Department of Toxic Substances Control Haznet data system.

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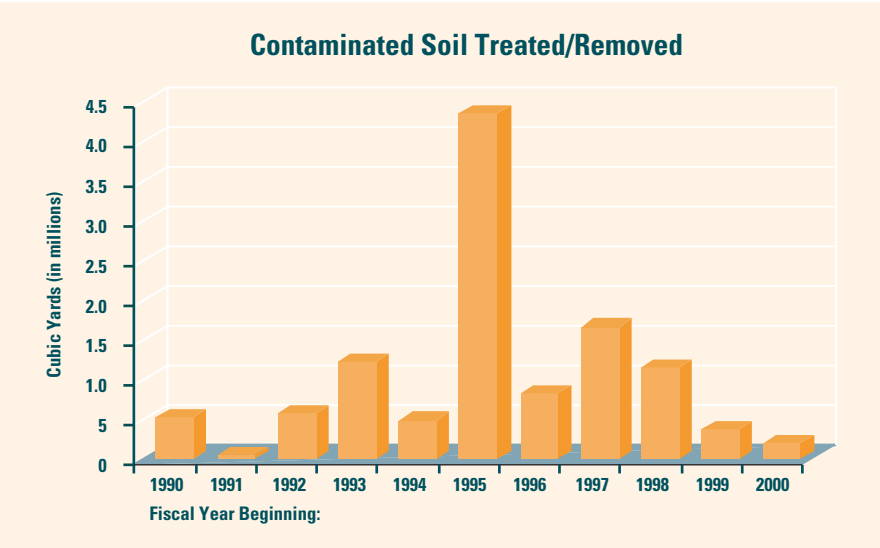
## Soil Cleanup

*During the 1990's, over eleven million yards of contaminated soil and other solids were treated or removed from sites.*

**Type I**

**Level 3**
**Goal 4, 6**




***What is the indicator showing?***

*The indicator tracks the volume of contaminated soil and other solids cleaned up at hazardous waste sites. Soil volumes have fluctuated over the past decade. (Note: Data were not routinely entered into the CalSites database until fiscal year 1996/97).*

### Why is this indicator important?

Contaminated soil poses a threat to human and ecological health. Treatment of contaminated soil reduces this threat by eliminating potential exposures to humans, animals, and the environment. Adverse effects on the health of humans, animals and plants can result from direct contact with contaminated soil. Also, soil can provide a source or "reservoir" for contaminants, since chemicals have the capacity to migrate from soil to other environmental media, such as air and water. Such movement to other media increases the likelihood of exposure to hazardous waste constituents. The ultimate goal of site cleanup efforts is to allow the appropriate reuse of previously contaminated sites. The feasibility of presenting a measure of the land area restored for use following cleanup will be explored.

### What factors influence this indicator?

Soil cleanup is the end-point of a lengthy regulatory process that generally takes years to complete. The process begins with a remedial investigation and feasibility study, which includes an assessment of the site history, development of a sampling plan, sampling and analysis of environmental media, human health and ecological risk assessments, and developing a feasibility study and remedial action plan. Typically, each of these steps involves public involvement and input; regulatory agencies are required to respond to public concerns by holding community meetings and preparing fact sheets for the affected community. The rate of removal of contaminated soil may be influenced by any of the steps in this process.

Treatment of contaminated soil may be influenced by the availability of resources, both within the regulatory agency having jurisdiction over the contaminated site, as well as the party responsible for cleanup. In some cases, removal and/or treatment may not be perceived by the responsible parties as being in their best interests. Costs arising from maintenance (restricting access, monitoring contaminant levels, etc.) are relatively low, but removing and/or treating contaminated soil frequently requires a large expenditure of capital.

Prevailing policies and available technology may also influence soil cleanup. For example, "natural attenuation" (i.e., allowing hazardous constituents to degrade to non-hazardous chemicals without intervention) became a viable response to cleanup of contaminated sites following publication of a scientific report on the behavior of petroleum contamination. This resulted in the adoption of remediation policy for petroleum contamination that reduced the emphasis on removal of contaminants, shifting the emphasis instead on long-term monitoring. The treatability of the contaminants and the availability (and affordability) of technology for treatment are also significant factors.

Additionally, certain characteristics of the contaminated site, such as the location of contaminants in inaccessible areas (soil beneath buildings, water mains, or power lines), may make treatment extremely costly or technically infeasible.

## Technical Considerations:

### *Data Characteristics*

The data were compiled from the Department of Toxic Substances Control's (DTSC) CalSites database, now called the Site Mitigation Program Property Database. The database contains information on sites in California where hazardous substances have been released, or where the potential for a release exists. The data were not routinely entered into CalSites until fiscal year 1996/97, when extensive revision of the database was completed. Data for prior years are less reliable.

The data used for the indicator are for the total volume of "solid hazardous substances" from contaminated sites removed and/or treated; these generally consist mostly of contaminated soil. The data are recorded for the fiscal year (July 1 through June 30 of the following calendar year) during which the removal action, expedited response action, interim remedial action, final remedial action, or certification action was completed.

Data for liquid wastes treated or removed from contaminated sites are not presented.

### *Strengths and Limitations of the Data*

The data only reflect cleanup actions under DTSC's oversight. Other state agencies, particularly the Regional Water Quality Control Boards, are also

responsible for the oversight of removal and/or treatment of contaminated soil. The data do not reflect actions initiated by other state or local agencies.

As an environmental indicator, the volume of soil removed and/or treated is an incomplete measure of the reduction in risk to human health and the environment, because it does not reflect the location, concentration or toxicity of the contaminants that are removed. Clearly, the removal or treatment of soil contaminated with low concentrations of less toxic contaminants from a remote area would represent a relatively small reduction in risk in comparison to removal or treatment of soil contaminated with high concentrations of very toxic contaminants from an area immediately adjacent to human populations or animal or plant habitat.

**Reference:**

Department of Toxic Substances Control, CalSites Database

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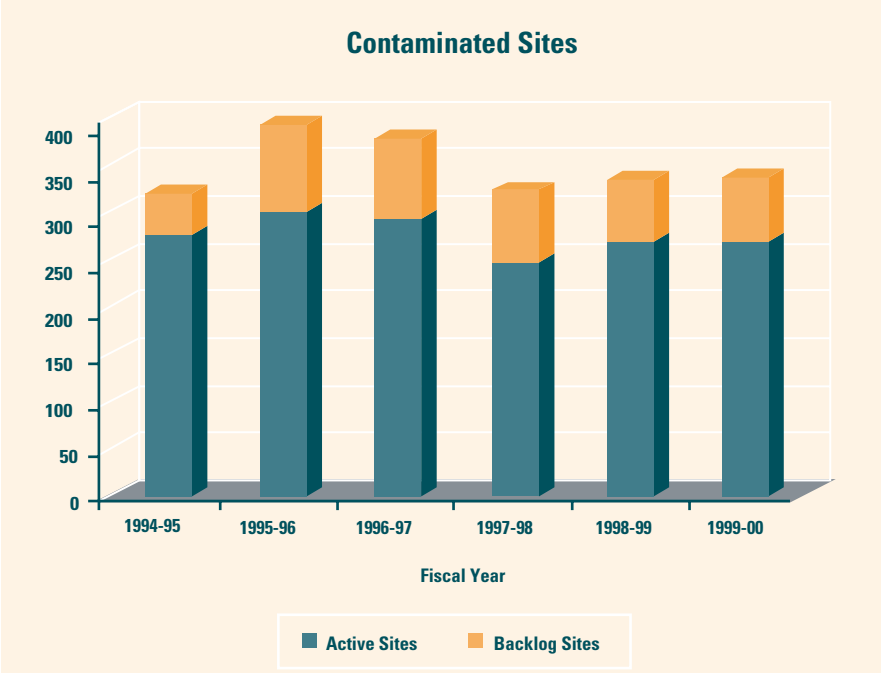
**Type I**

**Level 3**
**Goal 4, 6**

## Contaminated Sites

*Since 1994, there have been 300 to 400 active annual workplan and backlog sites in California.*




### What is this indicator showing?

*The number of contaminated sites has remained relatively stable, with "backlog" sites making up about 25 to 30 percent of all sites. Backlog sites are those not currently being investigated or remediated by the Department of Toxic Substances Control.*

### Why is this indicator important?

The indicator tracks the number of contaminated sites, including military facilities, legacy sites (sites with historical contamination or naturally occurring hazardous materials, such as asbestos), and sites on the federal National Priority, or "Superfund" List. Contaminated sites at currently permitted facilities are not included. An "active" site is a property having a confirmed release of hazardous substances that the Department of Toxic Substances Control (DTSC) is actively working to remediate. Active sites generally are high priority, high potential risk sites. A "backlogged" site is a property having a confirmed release of hazardous substances that DTSC is not currently investigating or remediating.

Contaminants in soil or other media pose a risk to human health and the environment (ecological receptors) should direct contact occur. Evaluating and managing contaminated sites with the ultimate objective of removing the contaminants will eliminate the possibility of exposure to the contaminants, thereby eliminating the risks.

Over time, contaminants can migrate from the original source areas to adjacent properties or to other environmental media, such as air and water. Leaching of contaminants from soil to groundwater is a particular concern if the groundwater

serves as a source of drinking water or is used for agriculture. If contaminated properties are not remediated, the scope and magnitude of the environmental problem may increase. The extent that contaminated sites that are either mitigated or treated reduces the threat of contaminant migration and reduces the possibility of harmful public health effects.

## What factors influence this indicator?

Site contamination can result from hazardous materials and hazardous waste management practices carried out at a facility. The indicator is influenced by DTSC's capacity and resources to identify and manage hazardous waste sites. The number of sites tracked by the indicator is a subset of the universe of all contaminated sites in the state. A more comprehensive accounting of contaminated sites — which will include those that are under the oversight of regional water boards or local agencies — will be provided in future reports.

This indicator does not reflect the complexity of individual sites. Large industrial and military sites can be complex and can require many years to evaluate and remediate. It is not uncommon for these sites to be "carried over" from one year to the next. Consequently, larger, more complex sites may absorb a relatively large proportion of staff resources. In contrast, smaller, less complex sites may simply require a Preliminary Endangerment Assessment and little or no remediation. Smaller sites often require considerably less staff time, and their certification as clean may not reflect a significant reduction in risk to human health and the environment.

Hazardous waste sites that are on the Superfund List are also tracked by this indicator. There are currently 96 Superfund sites listed in California, three sites proposed for listing, and five sites deleted from the National Priority List. A listing of these sites can be found at the U.S. EPA Web site, www.epa.gov/superfund/sites/npl/ca.htm

## Technical Considerations:

### *Data Characteristics*

The data were compiled from the CalSites database, which includes sites such as military facilities, "Brownfield" sites and legacy sites. Active sites are those which are listed pursuant to Health and Safety Code 25356, and are known as State Superfund or annual workplan sites. Sites are removed from this list after all remedial actions have been completed and the site has been certified by DTSC. Backlogged sites are those sites that DTSC is not actively investigating or remediating. However, before a site is backlogged, DTSC ensures that the site does not pose immediate hazards to the public or the environment. Data are given for state fiscal years, which run from July 1 to June 30.

The data were not routinely collected prior to fiscal year 1993/94.

### *Strengths and Limitations of the Data*

The data do not include hazardous waste treatment, storage and disposal facilities. Environmental contamination at these properties is addressed under the RCRA (Resource Conservation and Recovery Act) corrective action program. The data also do not reflect sites being investigated and/or remediated by other state agencies, such as the Regional Water Quality Control Boards or local agencies.

As noted above, the data do not provide a direct indicator of risk reduction, since complex sites, with relatively high concentrations of contaminants, and simple sites, with much lower levels, are counted equally.

These data do not show the extent of contamination, so the data do not directly show the reduction in risk to humans or the environment. Separate data is not currently available for federal National Priority List sites.

**Reference:**
Department of Toxic Substances Control, CalSites data base.

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## Federal and California-only hazardous waste generation

**Type II**

Total hazardous waste is presented as a Type I indicator. However, hazardous wastes regulated in California fall under two types: (1) hazardous waste regulated under federal law, known as the Resource Conservation and Recovery Act (RCRA); these are commonly referred to as "RCRA hazardous wastes"; and (2) hazardous waste as defined by regulations promulgated under the authority of California's Hazardous Waste Control Act; these are commonly known as "non-RCRA" or "California-only" hazardous wastes (although the latter is a misnomer, since some non-RCRA hazardous wastes may also be regulated as hazardous waste in some other states).

All RCRA hazardous wastes are also regulated as such in California. However, because of the broader scope of California's regulation, additional wastes are identified as hazardous in California. Under both RCRA and California law, a waste is designated as hazardous if it is ignitable, reactive, corrosive, or toxic. California's criteria for corrosivity and toxicity are broader than the federal criteria. For example, the toxicity criterion is applied using a list that includes substances not on the RCRA list, and California's Waste Extraction Test is more stringent than the federal extraction test. California law also regulates some wastes exempted under federal regulations.

Tracking RCRA and non-RCRA hazardous waste separately would allow comparison of California data with those of other states, and would enable aggregation of data for regional or national tracking. The current database for hazardous waste tracking, Haznet, cannot easily separate non-RCRA hazardous waste from federally regulated RCRA hazardous waste.

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## Hazardous waste imported/exported

**Type II**

Total hazardous waste generated in California is presented as a Type I indicator. The current hazardous waste tracking system does not allow for the tracking of imports of hazardous waste and exports out of the state. One reason is the different universe of hazardous waste in California compared to other states. California-only (non-RCRA) hazardous waste is no longer hazardous waste when shipped out of California. As a result, the manifest tracking system does not track exported waste from "cradle-to- grave," since the ultimate receiver of the waste is not required to complete the manifest information.

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Type II

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wminderm@ciwmb.ca.gov

## Cleanup of illegal solid waste disposal sites

The indicator will track the cleanup of illegal solid waste disposal sites where the responsible party either cannot be identified or is unable or unwilling to pay for the timely remediation, and where clean up is needed to protect public health and safety or the environment.

Currently, the tracking system for solid waste sites cleaned up is not available as a database. The Remediation, Closure, and Technical Services Branch of the Permitting and Enforcement Division of the California Integrated Waste Management Board does have information on the amount of illegally disposed of solid waste sites cleaned up, such as, location, type/volume of wastes removed, and site cleanup cost.

Type II

## Tire cleanup

It has been estimated that 31 million tires are generated each year in California. While representing only about one-half of one percent by weight of the total municipal solid waste stream, tires present an unusual disposal problem because of the special handling and processing needed to properly dispose of them.

As a result, California has between two and three million waste tires illegally dumped or stockpiled. These stockpiles pose potential threats to the public health, safety, and environment, particularly when they are improperly maintained or when they catch on fire. Uncontrolled open tire burning generates toxic smoke and other by-products such as pyrolytic oil and ash that may contaminate the air, soil, groundwater, and surface water. The intense heat leads to the generation of pyrolytic oil that mixes with extinguishing material, contaminating surrounding soils, surface waters, and groundwater (one tire can produce up to two gallons of oil).

Pursuant to Public Resources Code (PRC) §42826, the California Integrated Waste Management Board (CIWMB) may perform any cleanup, abatement, or remedial work required to prevent substantial pollution, nuisance, or injury to the public's health and safety at waste tire sites where the responsible parties have failed to take appropriate action as directed by the CIWMB. In general, these waste tire sites are referred to the Waste Tire Stabilization and Abatement (WTSA) Program once CIWMB's Waste Tire Enforcement Program has exhausted enforcement efforts. Typical remedial efforts conducted under the WTSA Program may entail stabilizing piles until they can be removed, removal of all waste tires, removal of contaminated debris and remediation of the site after removal of the tires.

To date, the CIWMB has awarded four contracts totaling approximately $8.1 million. Since 1995, CIWMB has removed more than 11.2 million illegal waste tires from 44 sites, at an average removal cost of $0.61 per tire, for a total cost of nearly $6.9 million.

| YEAR | Number of Sites | Remediation Cost | Total Number of Tires Removed | Average Cost Per Tire |
|---|---|---|---|---|
| 1995 | 6 | $870,832 | 2,154,400 | $.40 |
| 1996 | 6 | $389,487 | 411,436 | $.95 |
| 1997 | 9 | $1,367,760 | 2,832,916 | $.48 |
| 1998 | 7 | $2,726,196 | 4,488,325 | $.61 |
| 1999 | 15 | $1,568,905 | 1,334,500 | $1.18 |
| 2000 | 6 | $1,690,505 | 1,920,500 | $0.88 |
| Totals | 49 | $8,276,864 | 12,862,380 | $0.64 |

Remediating existing tire piles is a challenge. The costs associated with remediation are considerable, and property owners and operators are many times reluctant to expend the money for major cleanup operations. Compounding the problem is the fact that many tire piles are located on economically undesirable land where cleanup costs exceed the value of the land itself, making land seizure a hollow threat. In other cases the property owners are victims of unscrupulous operators (tenants) and do not have the necessary resources to pay for cleanup.

The legal process to bring about the cleanup of waste tires by property owners or to conduct a CIMWB managed cleanup can take years and can be expensive. This process is initiated only after direct negotiations fail and the CIWMB has exhausted its administrative enforcement actions against the property owners.

The current plan (in accordance with statue, PRC §42889) is funding both long-term and short-term remediation of illegal waste tire sites with CIWMB-managed contracts. This plan proposes to move aggressively on both long and short-term projects and proposes to cleanup all sites currently listed. However, there remains a backlog of uninvestigated sites that may ultimately require state-funded cleanup after enforcement has failed. Although the Program plans to move expeditiously through this backlog, these enforcement efforts will take time as staff research property ownership, take appropriate enforcement actions, and attain site access in order to conduct site remediation activities. The Program will initially prioritize these sites to ensure that the sites which pose the greatest threat to public health and safety and the environment are addressed first.

The current data base system does not contain information on every illegal tire site in the state. As sites are identified, inspected, and processed, data are entered. If the state determines a need to remediate, the site will be added to the Site Remediation Listing. Also, cleanup monies are awarded based on PRC §42889 that is very specific in how the money will be expended.

**Reference:**

California Integrated Waste Management Board, Tire Management Web site. Posted at: www.ciwmb.ca.gov/Tires/default.htm

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**Type III**

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## Number of environmental releases from active landfills

Despite the serious consequences that may arise from the migration of contaminants from landfills into soil, air or water, the extent and frequency of chemical releases from active landfills is unknown. Although such releases are tracked to some degree by various state and local agencies (such as those responsible for air quality, water quality and waste management), current regulatory requirements may permit only certain information to be collected from solid waste landfill owners and operations. The California Integrated Waste Management Board reports and tracks violations of "State Minimum Standards" at permitted solid waste facilities. These violations can be used to determine if further contamination/cross-media contamination investigation is needed. An indicator that tracks trends in environmental releases from active landfills would provide a meaningful measure of the effectiveness of structural and operational safeguards at these facilities in containing chemical contaminants.